THE OPTICAL MAGIC LANTERN JOURNAL AND PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR.

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Notes.

WE understand that Mr. A. W. Scott is prepared either to grant licences for or sell his patent of the "Verak" lantern.

* * *

THE headquarters of the Photographers' Benevolent Association have been removed from 65 to 55, Chancery-lane, the offices of Mr. W. J. Tabrum.

* * *

IT has been proposed that the Brighton Photographic Society be dissolved, such dissolution to take effect immediately upon the settlement of the liabilities of the society.

* * *

MESSRS. W. H. HUMPHRIES & Co., of 268, Upper-street, Islington, N., are about to extend their workshops for the manufacture of lanterns, cameras, &c., and are to discontinue their retail establishment.

* * *

THE law-suit that has for some time past been pending between the Eastman Co., of Rochester, New York, U.S.A., and the Celluloid Co., of New York, U.S.A., has lately been finally and amicably settled.

* * *

A SET of lantern slides of monkeys' hands would be rather an unusual order for a dealer to supply, but such will be projected at the next lecture given by Miss Dalrymple, the palmist, who intends discoursing upon the head, heart, and life-lines of gorillas.

* * *

AT the annual meeting of the Eastman Photographic Materials Co. (Limited), held at Winchester House, E.C., on 23rd ult., dividends were declared as follows: Preference Shares, ten per cent.; Ordinary Shares, seven per cent. The increase of business during the past year has amounted to over £7,000.

The Parkinson Gas Co., of Manchester, recently gave a demonstration of their process of extracting oxygen from the atmosphere, by which oxygen in a high state of purity can be produced at a cost hitherto undreamed of. They propose to sell the plant and grant licences for working the process on royalty.

* * *

At a children's lantern entertainment held on the 19th ult., at the South St. Pancras Liberal-Unionist Club, King's Cross, a boy accidentally knocked over the lantern, when the oil from its lamp set fire to a small space, which, however, was promptly extinguished. Many in the hall were not even aware of the occurrence; but unfortunately some one cried "Fire!" whereupon a general stampede ensued, and such was the rush for the staircase that about two dozen children fell on the stairs, and sustained injuries more or less severe. Several were conveyed to the hospital, and one little boy has since died from the result of his injuries. The others are progressing favourably.

—:o:—

A New Combination Oxy-Hydrogen Microscope.

Hardly has the last sound of the controversy over lantern microscopes died away, before we have another candidate for public favour in the shape of a combination lantern and table microscope. The accompanying illustrations clearly show the microscope in its two positions. In Fig. 1 it is adjusted for lantern use, and is shown with a portion of the draw-tube of the lantern attached. The large tube, bearing the maker's name, carries at one end a parallelising lens, and at the other a standard size sub-stage condenser. The sub-stage fitting, of course, permits of the use of a Wenham's parabloid, or any other piece of sub-stage apparatus. The stage is of the ordinary pattern, but is furnished with an exceedingly useful object clip, which, by means of a spring, permits a thick live trough or a thin slide to be inserted with equal facility, and without scratching the labels. The objective is mounted in a special short tube, which is made to take an amplifying lens if it is desired to protect the whole of a large object on a scale of any considerable magnitude. The polariscope fittings are simple, but permits the operator to at all times ascertain the position of his Nicol prisms. The polariser is fitted between the parallelising lens and the sub-stage condenser, and can be given a complete revolution by means of a milled head on the outside of the tube. There is a stop so placed that the tube is rotated till it is reached; the prism is then adjusted and can always be brought into the same position, during use, by turning the milled head till arrested by the stop. The analyser fits into the front of the objective carrier, and is also capable of a complete rotation, an indicator on the fitting serving as a guide for the adjustment of the prism in this case as well.

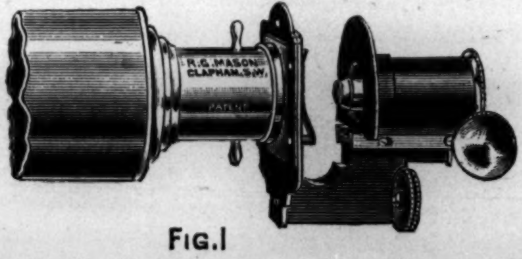


Fig. 1

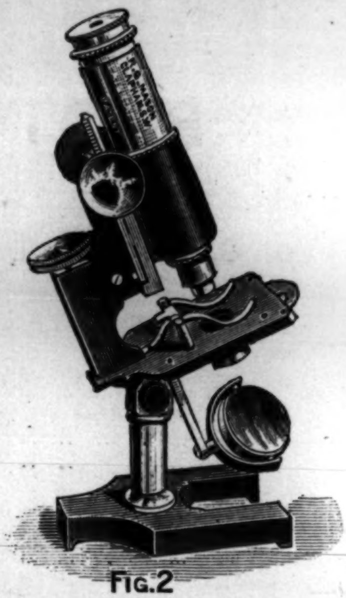


Fig. 2

The conversion to a table microscope is instantaneous. The stage is made in two layers, one of which is attached to the body of the microscope, while the other, in duplicate, is fixed on the foot and lantern fitting respectively; it is therefore only necessary to slip the body off one fitting and on to the other. The objective carrier is then removed and a draw-tube substituted, and all is ready for ordinary observations. It will be seen from the drawings that the coarse and fine adjustments are available for use in both positions, although the latter is hardly necessary for lantern work; for, the rack of the coarse adjustment being spiral, there is no "loss of time" while turning the milled head. All the working parts are compensated for wear, so that with proper treatment the instrument ought to last for a lifetime.

At the present time, when almost every microscopist is also a photographer, it is desirable that a projection microscope should be adapted for photo-micrography, and it would be difficult to provide a better arrangement for the purpose than the one under notice. The objective may be used alone, in conjunction with a specially-connected amplifying lens, or with the draw-tube and eye-piece. The draw-tube being telescopic, is capable of taking any eye-piece in ordinary use. For the benefit of those microscopists who are not photographers, we may explain that it is only necessary to fit an ordinary photographic camera to the tube of the microscope so as to exclude all extraneous light, and to focus the object upon the ground glass screen in the same way as for projection. The milled head of the fine adjustment is deeply grooved, so that a silk or rubber band may be passed over it on to a similar wheel fixed on a long rod passing under the camera and terminating in a milled head close to the ground glass, so that the operator can secure the sharpest possible definition by applying an eye-piece to the focussing screen while using the fine adjustment.

—:o:—

Dissolving Views.

BY G. R. BAKER.

IT is not all audiences that can be entertained by a large number of plain photographic slides being passed through an optical lantern, with but little, if any description of interest, and even when the reading or lecture is of a character to ensure attention, I have noticed with what relief a large percentage of a mixed audience view artistically-coloured slides and "effects." In the case of an entertainment where the latter predominate the whole matter centres on the perfection with which the illusions are performed.

Dissolving views date back to the year 1846, when the late Mr. Childe, the artist, introduced them, after having been at work for five years, expending much time and money in experiments. The apparatus he used in public consisted of 9in. condenser lanterns, fitted with sperm-oil lamps, having four concentric wicks, and one of the first, if not actually the first exhibition was given at the Adelphi Theatre, in a piece called the "Pearl of the Ocean." At first the dissolving effect was produced by manipulation of the hands over the nozzles of the lantern, then later by lowering the wick, and finally came the fans, so arranged as to open and close the lantern fronts.

All arrangements for dissolving introduced since, carry out (more or less) the same principles as first adopted, the lowering of the light at the present day being considered the most perfect system when gas is employed; whilst in the case of oil lamps being used, the fans are found to be most convenient.

It was not until De Phillipstall had the idea of blacking out figures, and projecting them on scenes that the "effect" slides were introduced, and on his coming to England from Germany quite a sensation was caused, and he made a large sum of money by the exhibitions.

These dissolving views and dioramic effects were continued in the good days of the old Polytechnic, when money was expended lavishly to accomplish many things new and effective.

The necessary requirement in the way of apparatus to produce dissolving views is that the two or more lanterns shall be placed in such a way that the pictures from each of them superimpose on the screen. This is accomplished by angling the entire lantern, if placed side by side, or in the case of bi-unials or triples by adjusting each front separately In the case of the triple the central lantern front is kept horizontal and the top and bottom fronts angled. The disadvantage of side by side apparatus is that it is inconvenient for one operator to manipulate them, but it is the only form that permits of the paraffin or other oil lamp being used as the illuminant.

The reason why (to my mind) dissolving views have been ridiculed in some quarters, is that the owner or user of the same has either not had artistic or well-arranged slides, or else has not taken the trouble to see that the pictures have been registered to each other and the lantern stages in which they had to be used,

Ordinary commercial slides of fifteen years ago were very different from those of the present time. At that period the pictures were hand-drawn, and, with the exception of slides issued by one or two firms of high standing, were mostly of the *loud* order. In those days it was usual at an entertainment for the operator to place the slide to be dissolved on in the lantern by guess work, and then to turn the light up a very little in order to dodge the slide into position to correspond with the one on screen, and then when all was right to turn the light up. But with modern adjustments the slide has merely to be placed it its stage and the light turned up, when everything will be found exactly in the required position on the screen. Photography at the present time is an assistance of great value in producing dissolving views, and the hand-drawn subjects must be produced with great care, for otherwise they will not bear criticism when shown by the limelight.

There are many places accessible to the photographer where he can secure a pretty picture for summer and winter, and if he takes care to mark the exact spot (by making a rough map and indicating distance from prominent positions, so as to establish a cross section point where his camera will be placed next time) he can make his first picture say when the snow is on the ground, and go again in summer, or *vice versa*. In and about the London parks and suburban commons there are many pretty little bits of scenery suitable for this purpose, and as regards the country, plenty of choice. We are all more or less delighted with change, children of large growth as well as the youngsters, and so I say give it a trial in a thorough manner, and see if you do not please your friends. How often has it been said after an entertainment given with first-class apparatus and slides, "How very nice it all was. I had no idea a magic lantern could do anything like that. How ever did you produce those pretty effects?"

Now let me try and show you how it is done.

First of all, we must get our apparatus, as far as the stages are concerned, perfectly true. Our optical systems must be identical, and the lights must be capable of being raised or lowered at will. A moving lantern front and stage may be thoroughly well made, but it is almost a matter of impossibility to get it so true that it shall retain its position for vertical truth at all points of its inclination. At first we used to get the stages true by trial or error, using a pair of similar pictures in standard-size frames, and altering the fronts until we succeeded in getting them very nearly exact. Then we fitted a kind of rocking arrangement, and I remember, in one instance, a large amount was spent in workmen's time and material, and a large expenditure of patience in getting a triple lantern correct. With these systems it did not follow that, if the registration was all right at one distance with a certain focus lens, it would be correct with another. It was not until a customer insisted on what I call a pin's-point registration that I thought of the present plan, and which was duly patented. A customer, after receiving his apparatus, which was in every way up to the standard of that time, said he could not register his effects properly. When I asked him to point out any want of register, he took five ordinary pins, and placed one on each side of the foreground, two in the middle, and one on top of the picture. Then, when the second picture came on, it was seen the position was not the same, and if the slides were to be true enough to interchange from one stage to the other, no modification of the apparatus then known could make it so. Eventually I came to the conclusion that, as truth was wanted in both the vertical and horizontal planes, a system of adjustment must be adopted that could, when once found, be fixed, and so I had rising runners made with adjusting screws, having lock-nuts at each end, and a strong stop (Fig. 1), also fitted with a lock-nut, for side of stage. Rising screws and registering stops had previously been used, but a combination of same with stop and lock-nuts was not known.

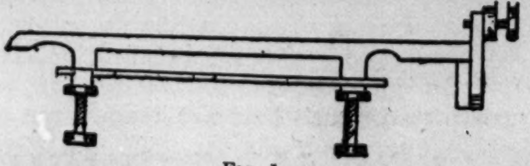


Fig. 1.

As it is necessary to have two standard slides to work to in setting the apparatus, similar crosses set in frames were resorted to, one line being vertical and the other horizontal, while letters in each quarter assisted for rectilinear correction.

Even this exactness has been improved upon by Sir David Salomons (Fig. 2), who has been perfecting the triple lantern for the past four years, and as he found the wooden frames liable to alter with dryness or moisture, and the film of the photographic cross an element of uncertainty, he had made—as an absolute standard to work from—mathematically divided registering slides so set from trued edges that the distances from the base and one side to the centre must always be the same. Although the first system is near enough for most purposes, yet for those who aim at absolute perfection, the latter is without doubt *the* system.

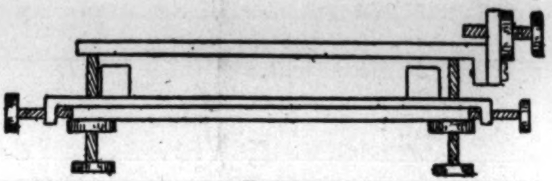


Fig. 2.

In the case of the ordinary wooden-framed slides, the requisite centering has to be accomplished by placing strips of cardboard in the groove of the wooden frames, until the picture is true to the eye. It is then placed in the lantern after the stage has been registered, and if it is found not to superimpose with the other slide, or slides, with which it is to register; then the frame must be planed away truly until it does so. With frames that have movements, such as panoramas, the registering must be done from stops fixed to the wooden frames to abut against the ends of runners. These runners must be exactly cut or filed, so that all are the same distance from the end to the optical centre of lantern.

In Sir D. Salomons' arrangement shown in Fig. 3, the exact distance can always be re-established—supposing for some purpose the side stop adjustment for ordinary framed slides has had to

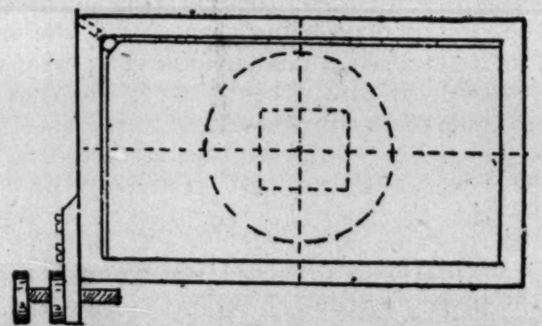


Fig. 3.

be altered. The standard adjusting abutment stop put to the standard cross slide, registers the distance from optical centre.

A distinct adjustment must be made for each front, and as an example of the necessity of fine adjustment and rigidity, the very fact of rotating the front lens in its tube is sufficient to disturb the collimation, as it is called, and so prevent perfect superposition. It will thus be seen that it will be necessary to place corresponding marks on lenses and tubes.

It is essential to glue and screw the wooden stops to mechanical slides, so that there is no fear of shifting after once adjusted. The ordinary elbow metal stop screwed to bottom of frame is convenient, and near enough for registration of ordinary slides, but is not certain enough for effects, as the sliding in of the frame against the runner may cause it to shift.

To register a set of slides the view is first put in the lantern, and focussed, care being taken to get it as nearly central in the frame as possible.

Then the effect is put in the second lantern, and it is seen how far right or left, or up or down, the same is out, when the frame is resting fairly on the runner of stage, and if the view cannot be shifted in its frame to superimpose, then strips of wood must be added to, or a piece planed off the frame of the effect to make it agree. We know by previous trial that our lantern is set true; therefore, if we register this pair to the lantern they will be registered for good, providing the lantern is set next time of use to its standard normal position, and this is readily done by the adjusting-screws of angling plates of lantern front, using the registering crosses in the stage.

It is seldom that slides are matted or masked so exactly that they will superimpose when dissolved one into the other; and metal masks are fitted to the fronts of the Premier Lanterns, that have been carefully cut of the same size and shape, a trifle smaller than the smallest commercial size cushion-shaped or circular openings. The result of this is that all pictures are practically the same size when projected on the screen in a series of slides either square or circular, and in the case of both circular and square pictures occurring, the triple lantern is capable of showing them as they come, two being cushioned-shaped, if the majority of slides to be shown are that shape, and the third circular—or two circular and one cushioned-shaped for majority of circular pictures. These masks can be quickly exchanged, if need be, for they fit with spring catches.

As regards dissolvers, as I said before, the best system is to lower and raise the light, and as one picture *must* be brought on before the other is taken off, I favour the four-way dissolvers; for with two for a bi-unial and three for a triple, complete control over the light is obtained. They can either be independent, and worked by the hand passing from one lever to the other, or connected by a rod and clamp that will set to dissolve one on to the other, or both on or both off.

This system gives more control, keeps each light separate and perfect, and permits of the apparatus being left after once adjusted, with only just a bead of light burning in each, whereas with a six-way dissolver, if there is an interval the taps have to be turned off of one jet, and on returning to the apparatus the light has to be re-adjusted, unless an intermediate cut-off is used.

I would mention here another advantage of using two or three four-way dissolvers for a bi-unial or triple lantern, that there is no fear of turning on or off the wrong light, as might be done by a six-way universal or star dissolver, or any single plug or compound dissolver controlled by *one* lever.

We come now to the rolling curtain arrangement, which makes most pleasing change from dissolving, and is particularly useful in showing maps, plans, &c., and for the opening and closing pictures of an entertainment.

The polytechnic rolling curtain was applied to one lantern, and the first picture following the curtain was kept subdued, and when the curtain was nearly down (that is, up on the screen) the light was raised. In the improvement suggested by Mr. Samuel Highley, the metal screen was made to uncover one lantern stage and open the other in a bi-unial, and this was further developed in the Bridgman and Malden triple lanterns made by Mr. J. H. Steward, the third lantern containing a proscenium and the middle one the curtain to fit in. The result of rolling down the metal curtain in the lantern is to roll up the middle picture (which in this case is a curtain), and at the same time and to a corresponding amount the statue or view in the top is then revealed. As the contrary, on drawing up the metal screen the curtain in middle lantern is lowered and the picture in top shut off. I found the simple arrangement answered very well for one set of lenses, but when another set was employed the same curtain did not answer, for there was an intervening black line, or else a white one. I then thought of the adjustment to bottom of opening so that the distance could be altered to suit the lens employed. When the first double-slide curtain shutter was made for Mr. Smith, of the Halifax Camera Club, a better system of getting this adjustment was provided by putting an adjusting screw at the top of the slide, and this is so easy of control that the operator can make the separating line narrow or broad at will, and white or black. It is most natural to be narrow and dark. The advantage of the double slide is that with both bi-unial and triple lanterns it never need be taken out of the lantern, for the next stage is always ready to receive the slide by drawing up the metal curtain after first dissolving off the light or shutting the cap of front lens of that lantern.

My Lantern.

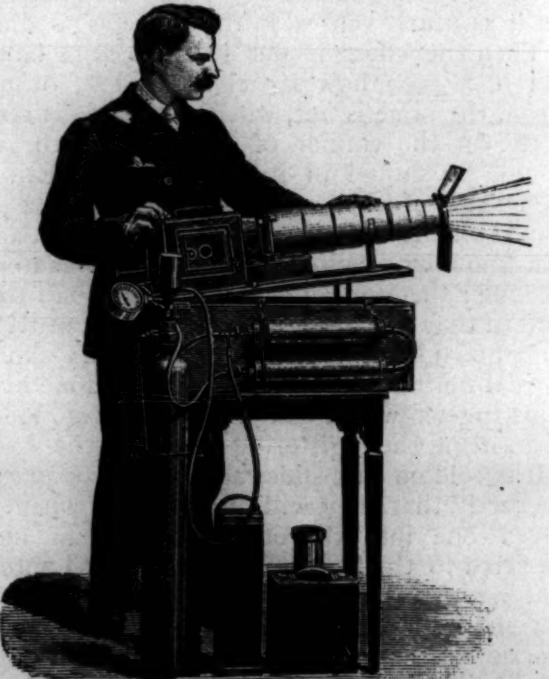
By E. H. Stevenson, Norwich.

The vice-president of the Lantern Society, in his interesting articles on "How I Became a Lanternist," says: "I eventually invested in a bi-unial, but why, it is rather difficult to say. If I was having another lantern built, instead of having a double I should have a single one, and instead of having the full size I should have one about 8in. square, and made so light that I could carry it, together with the lens and burner, in a box of small dimensions to any place I wished without having to resort to the assistance of cab, carriage, 'bus, train, or porter. I never could understand why lanterns were made so big, and I confess I do not understand it now; but having had a great deal of experience and inspected a large number, I can only say I think bigness to be a mistake. I believe it to be possible (and I speak as a partial outsider in this) to get a lantern that shall be duly ventilated and thoroughly practicable, of the small size just named."

I have had such a lantern constructed, and as the Editor thinks it very complete, and assures me that a description of it would be of interest to the numerous readers of *The Optical Magic Lantern Journal*, I now give some particulars of it.

The annexed illustration is from a photograph, and will give a fairly good idea of the instrument. The whole lantern, with its telescopic front, will close up and go into the small square box (less than 8in. square) which stands underneath the table. The body is made of Russian iron, with doors on each side. The condensers are $4\frac{1}{4}$in. diameter, and specially suited to the long focus front lenses, which are 10in. focus double combination achromatic lenses of $3\frac{3}{16}$in. in diameter, mounted in a brass cylinder. I also have fitted to this lantern, objectives of 4in., 6in., and 8in. focus, all mounted in cylinders of the same size. The lenses are focussed by turning a brass collar, instead of a milled head. The two brass flaps on the front of the objective I find very useful, and often very effective. They are each made to hold squares of glass. I generally have plain ground glass in the top flap, and ruby glass in the bottom. The ground glass I could not possibly do without when one is exhibiting mechanical and other slides in frames; before the framed slide is withdrawn the ground glass flap is quickly put down, and has the effect of dissolving; the slide is then changed, and the flap again raised. All this, by a skilful operator, can be done in ten seconds.

The ruby glass in the bottom flap can be used with great effect upon such a slide as an eruption of Mount Vesuvius, or Alexandria in flames. Coloured glasses can also be used in these frames to tint the sky and foreground of plain photographs. The carrier I use, is Beard's "Eclipse." After having tried every carrier I can lay my hands upon, I have come to the conclusion that is the best. The foot of the lantern, underneath the carrier, is, in my last lantern, made of brass, and not of Russian iron as in the above illustration, and I can now do away with the small pillar or support underneath the front tube, and without which the lantern is perfectly rigid. I have tried numberless jets, and the one that gives the best result I find to be Newton's, but I have had their taps replaced with Noakes' patent intermediate gas regulators, which are, I think, very much to be preferred to the ordinary taps. The form of lime-light I use, and which I believe to be the most satisfactory and the safest and best, is the oxy-ether. My saturator, which is specially made to my order, differs from others in these respects: I have no wood stand, but have the two



cylinders fastened together by a brass collar near the caps; on the caps are hexagon nuts, so with a wrench the caps can be tightly screwed on and prevent leakage of ether or escape of gas. I never remove these caps, but pour ether into saturator through a tin funnel, attached to which is a piece of rubber tube, stretched over the outlet of saturator. I also have taps on the saturator, and the T piece forms part of the saturator. Thus my saturator (although only half the size of the ordinary commercial saturator) is far more perfect, and hangs beside the lantern, instead of laying on the table or floor.

The box upon which the lantern is fastened is not seen to advantage in the illustration; this is made of well-seasoned mahogany, and is made to carry—the saturator, regulator, gauge, limes, reading lamp, &c. By two long screws with handles inside this box, the lantern is raised to any desired angle. It is obvious that if the lantern were being used in a large and crowded hall, with the screen raised upon a platform at the end, the position of the lantern in the illustration would be much too low. But when the lantern is in actual use the box is raised nearly 2ft. by means of two ends or legs, which are fastened by T screws to either end of the box; these legs are carried in the box when packed, and form a partition down the middle, and thus makes it much easier to pack the different things. When the box is in position with the legs on, the lid—which is on the opposite side to the saturator—falls half way down, forming a desk, on which I place my lamp, notes, &c., and inside the box, the slides, limes, matches, lime tongs, and knitting pin. This knitting pin, which is in a small holder, I use as a pointer. As I frequently have to lecture and operate at the same time, and therefore cannot stand by my screen, with this knitting pin I point to any desired object on the slide, which has a better effect than pointing to it with a pointer at the screen, to say nothing of the difference in size between a knitting pin and a 10ft. pointer and the greater convenience for transit of the former, which is a great consideration for lecturers and lanternists, who, like myself, have to be in different halls, and perhaps different towns every night. The rubber tubes in the illustration are unnecessarily long. The tall box underneath the table contains one hundred slides, securely packed and protected by rubber tubing running the whole length of the box inside, top and bottom.

Although my lantern is small (when packed it is exactly a twenty-fourth part the size of another single lantern I possess), efficiency is in no way sacrificed for portability; the condensers and front lenses are unusually large, in fact, are the same as you will find in the largest and finest lanterns in the kingdom, and the illuminating power is equal. Of course it is but a single lantern, but, with the carrier described, I can change the slides quicker and easier, and with an equally pleasing effect to dissolving with a bi-unial, besides burning much less gas, having to purchase but one set of lenses, and only one lime and jet to look after.

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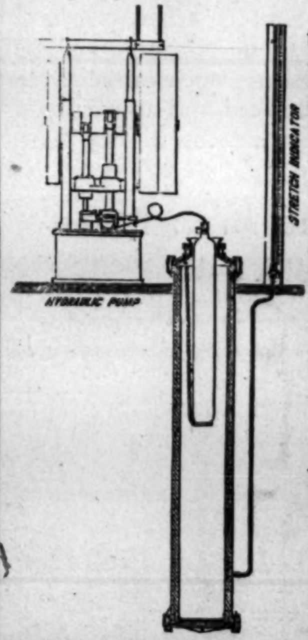
Testing Oxygen Cylinders.

By Henry Brier.

It has generally been considered sufficient to test cylinders by simply pressing them with water to the desired pressure, but this system is very faulty, inasmuch as, although it shows a cylinder's capability of withstanding the required pressure on that occasion, it does not indicate if it has become damaged thereby. To overcome this difficulty, several trials were made in 1890 with an apparatus which was designed to indicate the stretch of cylinders, with which very marked results were obtained, and this plan of testing has now been adopted by the Scotch and Irish Oxygen Company, of Glasgow.



The illustration shows the testing apparatus, which explains itself. Each cylinder, on reaching the works, receives a number, by which it is known; it is filled with water in the usual manner and is placed vertically in an iron envelope, as shown, and is supported by three chains. The envelope also is filled with water to the exclusion of air. A perfect joint is made round the shoulder of the cylinder by means of a flexible rubber ring, which can be at will instantaneously inflated by means of water drawn from any convenient source; in this manner all communication between the envelope and the atmosphere is closed, with the exception of an outlet through a small-bore glass tube, which serves as an indicator of displacement of stretch. The cylinder is then coupled up to the hydraulic pump, and the test is made as follows: The height of the water in the gauge glass is first marked. The pressure is then put slowly into the cylinder by means of the pump, and stretch in every case is shown from the moment the first indication of pressure is seen on the pressure-gauge; the water in the gauge-glass rises with every stroke of the pump, until the maximum pressure is reached, on release of which it falls, with good cylinders, to its original position, showing that the elastic limit of the metal has not been passed, and the cylinder in no way damaged. The cylinder is then stamped with the test-mark if proved sound, the pressure of the test, and the date, and the test is recorded in a book, with the name of the maker and the signature of the person who saw the test carried out.

All cylinders destined for a working pressure of 1,800 pounds are in this manner tested, to 4,000 pounds per square inch; and, for fear of over-straining them, special care is taken that the makers do not previously test them to more than this pressure, which is considered to be a safe and sufficient test for cylinders of the section and quality of steel now employed.

A forty-foot oxygen cylinder, when tested to 4,000 pounds, has sufficient elasticity to displace, on an average, a column of water 22in. high by $\frac{1}{4}$in. diameter, and to return again to its original state; this cylinder would measure $5\frac{1}{2}$ inches diameter by 31 inches long by $\frac{7}{32}$ inch thick. It will, therefore, be readily seen that this system of testing gives an insight into the behaviour of the cylinder whilst under pressure, with sufficiently broad results to be easily applied and appreciated in the ordinary workshop by any intelligent man.

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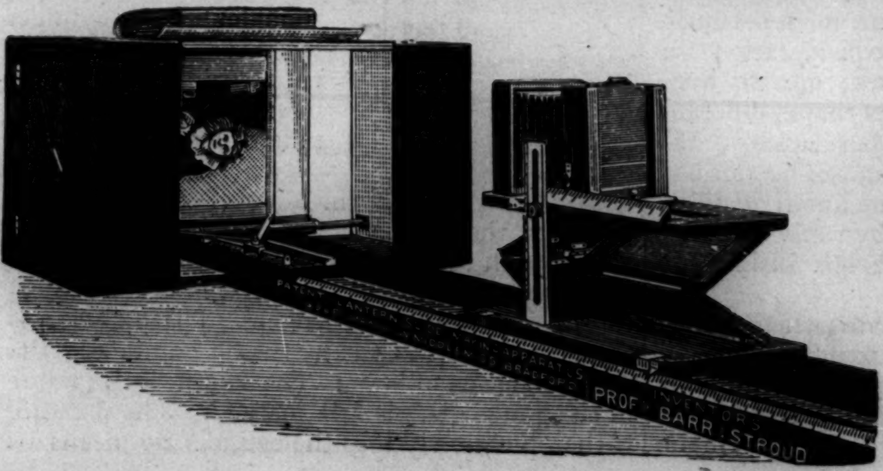
The Optical Lantern in Class-Room Work.—II.

By Archibald Barr, D.Sc., M.Inst.C.E.,
Regius Professor of Engineering in the University of Glasgow.

The difficulties met with in photographing book illustrations, engravings, &c., by means of an ordinary camera, are chiefly these: (1) The supporting of the book so that the illustration to be photographed shall be properly presented and held flat; (2) the even illumination of the illustration; (3) the adjustment of the camera, at the proper distance from the illustration, to secure a photograph of the desired size; (4) the adjustment of the camera so as to have the image in the centre of the plate, and to have the lens directed perpendicularly to the illustration at its central point. These difficulties are, of course, not insurmountable when an ordinary outfit is used, but they are of such a troublesome kind—on account of the adjustment being disturbed in one respect while being improved in another—that satisfactory results are seldom obtained, and, as a consequence, the preparation of slides from book illustrations, engravings, &c., is expensive and little practised. The fourth adjustment referred to is especially troublesome with ordinary apparatus, and any want of accuracy in its accomplishment causes the photograph to be a perspective of the original instead of a true copy, lines which are parallel to each other in the original being inclined in the photograph.

An apparatus for overcoming these difficulties is here shown, consisting, in the first place, of a "book-holder"—seen to the left in the illustration—in the form of a box-shaped frame, partly open in front, and provided at the back with two vertical sliding boards—one of which is seen in the figure. These boards are so connected together that they are constrained to move simultaneously, and to an equal extent, towards or from the centre of the frame. A scale is provided upon the frame, to indicate the width of the space between the inner edges of the boards. The edges of the boards are furnished with vertical scales, to be used in adjusting the camera to the required height. A pair of Argand gas burners or paraffin lamps are provided—one behind each of the front boards—to illuminate the illustration.


PATENT LANTERN SLIDE MAKING APPARATUS
INVENTORS
PROF. BARR. STROUD

The camera support slides upon a railway, which is attached to the book-holder by pins, and can be lifted off and folded up when not in use. The railway carries a scale, used for setting the camera at the proper distance from the object.

The carriage, which slides on this railway, supports the camera by means of two pairs of hinged boards, the hinged edges of one pair being at right angles to those of the other pair. This novel mechanism allows the camera to be raised and lowered only in a vertical line, and prevents its going out of level, either longitudinally or transversely. A spring is fixed at the hinge of one of the pairs of boards, so as to force them apart and very approximately balance the camera, which can be raised and lowered by a touch, and will not fall when let go. A vertical slotted rod with binding screw serves to fix the camera at any required height. This slotted rod has a scale upon its edge, to enable the operator to set the lens level with the centre of the picture.* The back-end of the camera slides upon the base (no screw is used), and a scale is provided for setting it to the correct focus.

The method of using the apparatus is as follows: The object or illustration to be photographed is measured. Suppose it to be a book illustration, and to measure 6in. in the direction of the height of the page, and 8in. in the direction of the breadth of the page. The sliding boards of the book-holder are opened to 6in., as indicated by the scale on the frame, and the book is placed, as shown in the engraving, with the page opposite the illustration resting on the top of the book-holder and the illustration itself exposed between the edges of the sliding boards. If the book is thus held open, the illustration is flat and vertical and its centre is exactly over the centre line of the railway; and the carriage is now moved along the railway till the index points to 8 (8in. being the longer dimension of the illustration assumed), when the camera is at the correct distance from the illustration to give the largest photograph that can be put on a slide of the ordinary size. The back of the camera is now moved to the graduation 8 on the base, and it will then be perfectly focussed—as exactly focussed as it could be by means of the ground glass after very careful and slow adjustment. The operator next reads from the scale on one of the sliding boards of the book-holder, the graduations opposite the top and bottom edges of the illustration—let these be 1 and 9 respectively. He adds these together, and sets the index attached to the camera base to the sum (10) upon the scale on the vertical slotted rod, and clamps the camera at this level. The lens is now at the height of the centre of the illustration.

In this way, without using any ground glass, the camera is set at once, so that it will give a *true* copy of the original, exactly of the required size, exactly in the centre of the plate, and perfectly in focus. All the adjustments are easily made in a few seconds. The dark slide is dropped in, the shutter lifted, and the lights turned up simultaneously by one stop-cock. No cap need be used. The exposure will depend, of course, upon the kind of plate used, the size of the stop (if any), and the nature of the light: one minute or one and a-half minutes will usually suffice. Transparencies are printed in the usual way from the negatives obtained—most conveniently by gas or candle-light. Loose engravings, sketches, &c., are held in position by a large book placed in the manner described, or they may be pinned on to a board having a projecting ledge which rests upon the top of the book-holder.

To prepare transparencies directly from negatives of any size, the negatives are supported at the front of the book-holder by means of a pair of grooved carriers, and a sheet of white paper is placed at the back of the book-holder to reflect the light through the negative. The scales are used as before, except that a mark on the carriage, near the lens end, is used as the index for the railway scale, and the vertical scale on the edge of the front board of the book-holder is used instead of the scales on the sliding boards.

Slides may be prepared in a similar manner from natural objects, such as botanical or other specimens, which are placed at the back of the book-holder, and illuminated by one or both of the lights, as may be required, to show them in proper relief.

The appliances described have been in use for some time at the Yorkshire College, Leeds, and have led to a very great extension in the use of the lantern in almost all the classes—for example, in chemistry, physics, biology, engineering, English history, classical antiquities, and in the technological and medical departments. Many thousands of lantern slides have been prepared in this way, and a photographic operator is constantly employed to meet the demand for fresh illustrations.

The substitution of lantern illustrations for wall diagrams has the great advantage that one moderately-skilled photographic operator can, at a cost of a few pence per slide, make perfect reproductions of illustrations bearing on subjects so widely differing as biology and engineering; and a dozen illustrations can easily be ready at a day or two's notice. On the other hand, to prepare large diagrams requires, in most cases, very considerable artistic skill and a more or less intimate acquaintance with the subject-matter of the illustration, and besides, the process is a very slow and costly one. No doubt the time will soon come when the lantern will be extensively used, not only in universities and colleges, but in ordinary day-schools, in connection with all subjects capable of pictorial illustration.

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* Since designing this mechanism, the author has learned that a mechanism similar in principle had previously been devised by Mr. H. M. Brunel for other purposes.

The Lantern in Dublin.

By Enthusiast.

During the present year the lantern is having much work to do. There is hardly a meeting at which any attempt to lecture is made, without such lecture being illustrated by lantern-slides. Some are excellent, others moderate, while a third division is decidedly bad. It may easily be judged how this arises, when it is observed further, that on corners of the slides exhibited are numbers and well-known initials of lantern-slide makers. Then comes a few made by the lecturer "as mementoes of the journey taken," or something of the kind, while the last class often is due to their being painted diagrams badly executed.

In looking over the list of fixtures of the Photographic Society of Ireland, there are thirteen evenings advertised. Of these, nine will have the lantern in use. At the lectures of the afternoon series, of which fourteen are advertised, about nine will be illustrated by the lantern. It is observable that at nearly all the social societies, some of which are sectarian, the magic lantern is very much resorted to, both for amusement and profit as well as instruction.

The Royal College of Surgeons of Ireland is being provided with an excellent lantern, to be illuminated by the electric light, while nearly all the other medical teaching schools in the city are provided with lanterns of one description or another.

All men, however, are not good lanternists; and of course we have at times to put up with errors which should not otherwise occur. Then, again, lecturers do not always hand their box of lantern slides to the lanternist ready spotted, so that in the middle of an oration the audience commences to titter, and the lecturer has to observe that the slide is upside down. It is, however, to be observed that thus far the class, quality, and finish of the slides is better than last year; so also, there are fewer errors during the display.

As may naturally be expected, the Photographic Society of Ireland Lantern Exhibitions rank high. The slides this season have been good, the subjects picturesque in their arrangement, and the lanterns are worked with precision.

At a crowded meeting on the 12th inst., Mr. Clibborn, of Liverpool, delivered an excellent lecture, admirably illustrated, entitled "The High and Byways of Italy." He lectured at the Friends' Institute also, on the night previous, subject, "Tour in Touranie," and his lecture was well appreciated. Lectures on "Morocco" were delivered by Mr. Meakin, at the Royal Dublin Society, at which a lot of lantern slides were shown.

Editorial Table.

Arcas Silver Plating.—From the London Metallurgical Co. (Limited), of Turnmill-street, E.C. We have received a sample of their new Arcas plating which is an alloy of silver. It has a fine appearance, does not readily tarnish, and is cheaper than silver-plating. It is claimed that, being harder than silver, it will resist wear to a much greater extent. From the brilliancy of the sample before us we think it would be excellent for the reflectors of oil lanterns.

Optical Lantern for Teaching (London: Hazell, Watson and Viney).—The matter of this book originally appeared in a series of articles in the *Photographic Quarterly*, and the author (Prof. C. H. Bothamley), has in the forty pages given instructions for the use of the lantern in language which is clear and to the point. Price 6d.

Messrs. Mawson and Swan have sent us a parcel of pamphlets, which contain information of great value. "The Wet Collodion Process for Iron Development" (price 3d.) treats fully upon the subject, and explains the nature of the collodion, nitrate bath, developer, and intensifier required when making negatives, and also contain full details of manipulation and causes of failures. The "Set of Labels" (3d.) is very complete, and we are glad to see that they are *not* gummed at the back. This enables any particular one to be readily detached without finding it firmly glued to the opposite page. "The Exposure Note Book" (3d.) contains a number of tabulated pages, with side headings for number of slide, hour, stop, exposure, light, and subject. "How to Make Transparencies" (free) is a new edition of a pamphlet upon which we commented in October, 1890, and contains much that is of interest to the photographer and lanternist.

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Correspondence.

PAPER LANTERN SLIDES.

[*To the Editor.*]

Dear Sir,—Perhaps Messrs. Theobald will give the number of the patent they state that they hold in connection with paper lantern slides. After reading their letter in last issue, I referred back to the paragraph, which appeared in the January number, but fail to see the connection between its contents and the letter alluded to. The paragraph mentioned that an emulsion was spread upon a certain paper and transparencies were printed thereon (by photography), whereas the slides referred to by this firm are lithographed. Would this firm have us believe that transparent paper cannot be used for making pictures upon except with their sanction? If so, the sooner they get rid of that opinion the better.—Yours, &c.,

J. D. Fisher.

STEREOSCOPIC EFFECTS WITH THE OPTICAL LANTERN.

[*To the Editor.*]

Sir,—I have read Mr. Teale's letter on this subject in the February number of the Journal, but do not feel that he has said anything which throws more light on it than there was in his original paper. He laid down certain rules which he said must be adhered to in order to obtain stereoscopic effect, which could only mean that the two pictures must be shown together or superimposed on a screen, and now he says the stereoscopic result is as much out of reach as the *perpetual motion*. We all know that that is beyond our reach, and if we admit that stereoscopic effect with the lantern is as impossible, there would be no use in troubling ourselves further about it. But, although Mr. Teale says it is impossible, I have good reason to believe that, to some extent, I have solved the problem, by simply using a very large ordinary stereoscopic arrangement.

Mr. Teale theorises to a large extent about the impossibility of seeing pictures or printed matter at an angle, but with me his suggested experiment with a printed page only tells when the obliquity is very great, or the page so far removed as to be beyond the focus of the eyes; and, to carry out the principle, when a single lantern picture is shown in a large hall, it ought to be impossible for people towards the side of the hall to see it, but they do see it, although not in such true perspective as those at right angles to it. I have more than once written on the necessity for viewing perspective drawings or photographs from one particular point, in order to see them correctly, and, so far, I perfectly agree with Mr. Teale; but many people do not understand, or do not care for, mathematical exactness, and so are perfectly satisfied to see a picture obliquely, in false perspective, and I merely hold that if a pair of stereoscopic pictures were shown instead of a single picture, and the observers had optical means of combining them as in an ordinary stereoscope, the perspective would be no worse than in the case of a single picture, while they would most certainly see the combined pictures in stereoscopic relief.

An experiment on a small scale to prove this can perhaps best be made by those who, like myself, can see stereoscopic pictures with the eyes alone, that is, without a stereoscope, and I find that after the picture is presented to the eyes in a normal position, it can be turned on its centre, to an angle of 45deg. without materially affecting stereoscopic relief; but, of course, true perspective is completely sacrificed, though not to a greater extent than it would be in the case of a single picture seen at the same angle. As may be expected, also, there is a certain amount of straining of the eyes, probab ly caused by their being forced to work at different foci.

Everybody knows that the eyes of some portraits always appear to look at the observer, whether he stands right in front of the picture, or towards one side. This is very similar to the other case. The height, width, and the perspective, of the picture are thrown out of true proportion, when it is seen obliquely, but that does not affect the apparent direction of the eyes, which may be considered as representing the stereoscopic effect of the other picture.

Mr. Teale has apparently given the subject a great deal of consideration, and therefore it seems strange to me that he should be unable to see the doubled images, which are a physical necessity of binocular vision, because any person with two normal eyes, when he holds a finger up between his eyes and a candle, and looks at it, must see two candles, or when he looks at the candle he must see two fingers. Sir David Brewster, in his "Optics," calls attention to this fact, and I have no doubt that it was noticed by Adam, as soon as he began to use his eyes. If Mr. Teale can see no doubled images, his eyes are probably of unequal power, in which case the strong image, in one eye may overpower the weaker image in the other.

It may not be out of place to say that what at first sight may seem to be a defect in our eyes—the confining of distinct vision to almost a point in the retina—is in reality one of those beautiful provisions of Nature which are so admirable when fully understood. In this case, the retina is only sufficiently sensitive for some distance round what may be called the point of sight, to give an indistinct picture—or "suggestions of form," as Mr. Teale happily expresses it—and therefore, although many objects are necessarily doubled when seen by both eyes, the images are so indistinct that we feel no inconvenience, and observe no confusion, which would unquestionably be felt if we had distinct vision over a large surface of the retina.

Another curious assertion of Mr. Teale's is the fancied necessity for a "blackened separator," or screen, extending from between the eyes, sufficiently far to hide one of the pair of pictures from each eye. In some cases this may be a convenience, but it is by no means a necessity, because when people use their eyes to see stereoscopic pictures without a stereoscope, they never think of using such a screen, and find no inconvenience from the want of it. Besides, the stereoscope itself is often used without the screen, the only difference being that there are then seen three pictures, the middle one distinct and stereoscopic, and the side ones indistinct, the former being the combination of the right and left-hand parts of the slide to which the eyes are directed, and the latter the remaining portions not directly looked at, and therefore only imperfectly seen.

Mr. Teale recommends that the pudding should be proved by its eating, and to an extent which satisfies myself, I have done so, and am very sorry that I could not invite him to share it.

My experiment consisted of throwing the images of a pair of stereoscopic transparencies, side by side, on a wide screen, by means of two lanterns; but my first attempt to combine them by the use of prisms, was a failure, in consequence of the prisms being faulty. I had prepared hollow prisms by cementing strips of glass together and filling them with water; and, although when held before the eyes, they caused the pictures to combine, the glass of which they were made was imperfect, and destroyed the definition.

The next experiment was a complete success. It was simply to change the pictures from one lantern to the other, and combine the images on the screen by *squinting*, the right eye looking at the left-hand picture, and *vice versa*. The result was as perfect stereoscopic relief as could be got with an ordinary stereoscope, but more striking from its being on a large scale. I tried the effect of looking at the pictures obliquely, but when the angle was about 30deg. from the centre line, the squinting was somewhat straining on the eyes, still, stereoscopic relief was plainly visible, although, as a matter of course, the perspective was decidedly faulty.

I greatly regretted that I had no one with me to share my pleasure, there being only some members of my family present, who could not manage the squinting part of the business; still, as I had prepared several pairs of pictures expressly for the experiment, I had quite an interesting private exhibition of lantern stereographs, for the first time in my experience.

Although I am unable, from other occupations, to experiment further in this direction at present, there is a small possibility that some one else may take the matter up, and to such a one I would suggest that there might be an advantage, so far as regards the viewing of the pictures obliquely is concerned, in showing them on the screen one above the other, in place of side by side. This would prevent their being seen by squinting, but by using a proper pair of prisms, one picture could be made to appear as if raised, and the other lowered, so as to overlap and appear stereoscopically. Or one eye might see one picture direct, and the other eye see the other picture through a prism.

Sir David Brewster describes a form of stereoscope made somewhat in this way—that is, a reflecting prism for one eye only.

I have great doubts of a good result being obtained by using plain refracting prisms, as, however well they were made, they would be likely to produce a certain amount of distortion, and also show the objects with coloured edges; but perhaps a better result could be got by using reflecting prisms, similar to that of the Camera Lucida. I am not enough of an optician to know if such prisms could be made adjustable, in order to suit different distances from the screen, or different angles, but think that it may not be impossible.

For all this, I consider the whole question more as a curiosity, than as a practical means of exhibiting stereoscopic pictures to a large audience, and believe that they could be shown properly to only a small number of observers.

It may perhaps be right to add that the combining of stereoscopic pictures by squinting, is as old as the introduction of the stereoscope, as it is alluded to by Sir David Brewster in "Optics," when speaking about his invention of the lenticular stereoscope.—Yours, &c.,

GEO. H. SLIGHT.

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Notes and Queries.

L. A. Vicary writes: "I have a large mahogany lantern that I bought some time ago. When I bought it, it only had one condenser—the condenser nearest the lamp—which was 4½in. across, plano-convex with convex side nearest the lens. I bought another condenser, 4in., at an optician's in this city (Bristol) curved both sides. This I placed not quite touching. When I exhibit my lantern, a picture 6ft. across is hazy or misty at the sides. Ought I to have different condensers? or can you suggest what ought to make it right? A reply in the *Optical Magic Lantern Journal* for March would greatly oblige." *Answer.*—Turn the condenser which is next the jet, so that its flat side faces the illuminant.

R. Graham asks: "Has the name 'Photoscope' ever been applied to an apparatus, and if so when, and by whom? *Answer.*—If we remember rightly, Mr. Brooks, of Reigate, had something to do with an apparatus of this name fifteen or sixteen years ago.

F. Rogers.—The shape of the mat is to a great extent a matter of opinion. If you think a particular view will look best in a circular mat, use it; and if in a dome-shaped, employ that form.

B. B. writes: "The reflector of my oil lantern has become a dark blue-black. How can I silver it again?" *Answer.*—From your description, a rub with a little plate-powder will restore the reflector.

Leaky Gas Bag.—Having ascertained the position of the leak, cement a small piece of mackintosh cloth over it by means of india-rubber solution. We do not understand your second question.

Zinal writes: "I have lately been trying Stock's lamp against another, to see which was the better, but I had rather a curious experience. I had two lanterns and lenses, which gave the same size disc, and placed one lamp in each, and concluded that Stock's was vastly superior to the other, but a friend who was present suggested that the lamps be interchanged. I did so, and found that my old one was then the best. Can you inform me how this can be, for it seems very strange?" *Answer.*—It is probable that the lantern in which "both lamps" appeared best, is fitted with condensers of shorter focus than the other.

M. Dell says: "I use a portrait lens for my lantern. Have lately taken all the glasses out to polish them, but now it is not so good as formerly. It occurs to me that perhaps the glasses are not put in, in their proper places. Kindly say which sides of the glasses are put into each end of the brass tube, but as I do not understand the technical names of the different shapes of the lenses, please use only such a description that I (a novice) can understand." *Answer.*—We shall endeavour to be as explicit as possible. Place the thick lens, which is a cemented lens in the cell which screws in the front part of the lens tube, so that the convex or rounded side is outmost. The back combination is placed as follows: Into the cell place first the glass that magnifies, so that its flattest side will be outermost, then the small metal ring, and upon this the concave or diminishing glass, so that the hollow side is next the metal ring.

J. M. Turnbull.—We fail to see that the spirit jet described is "forty years behind the times," and also that the "sticking" of the valve, causes the spirit to overflow, and "often sets the lantern on fire." As a matter of fact, the valve opens (and remains so), just as soon as the reservoir is in place. Of course in careless hands it is a simple matter to spill the spirit, but this is not the fault of the lamp, nor can it possibly be caused by the valve sticking. After trying your lamp we shall be pleased to state any advantages it may possess over those now commonly employed.

Amateur writes: "I use a triple lantern, regulators on bottles and mixed jets; occasionally I want to use a fourth lantern to illuminate the person singing. Will it be safe to do so from the same bottles?" *Answer.*—Yes, quite safe; connect T pieces at bottles.

R. A. R. Bennett.—Yes, the apparatus is good. Your simplest way is to order the cartridge paper through a stationer in your town, and if necessary give him the name of the wholesale firm in London where it can be obtained. Post-card sent.

W. S. Holloway.—(1) Measure from midway between the lenses. (2) Only by trial. (3) We do not understand what kind of dissolver you wish.

J. W. Wright.—(1) A piece of camphor about the size of a Spanish nut will suffice, if you warm the oil. The wicks may require cleansing occasionally. (2) The only preventative of smell with oil lamps is cleanliness. (3) Have never used alum in oil, but find that the addition of a little salt is an improvement with some oils.

John Stewart.—You perhaps do not know that the firm you mention have introduced a similar apparatus to your own, consequently when you were told that So-and-So's was "no good," we presume it is because every inventor thinks his ideas better than his neighbour's.

A. Drewry.—(1) It is quite safe to use two bottles of same capacity, one (hydrogen) full, and the other (oxygen) half full, with mixed jet. There is no fear, as you suppose, that the contents of the one bottle would find its way into the other. You evidently forget that the rubber tubing connecting the two bottles (so to speak) would burst if any great internal pressure were brought to bear upon them. (2) Regulate the supply by the taps at jets.

Subscriber (Christchurch, N.Z.). — Have written by this post and have asked Mr. Stocks to write you.

E. D.—(1) You will have no difficulty with a blow-through jet, and both gases from cylinders. (2) Both cylinders need not contain the same quantity of gas. (3) The standard size for frames is 7in. by 4½in. (4) Keep the limes from air and damp, and they will remain good.

F. A.—We do not answer questions unless we get name and address of correspondent, and this you have omitted. Your ten questions would be suitable for a column headed "Wit and Humour," and we are only surprised that you did not add an eleventh, such as "If I lift a red-hot lime with my fingers, will it burn me?"

"*Husbands.*"—Mr. Charles Darker, 53, Waleham-road, Forest Hill, London, and Mr. Norton, 38, Marchmont-street Russell-square, London.

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TRANSPARENCIES printed by contact possess a charm not present in those printed in the camera.—*F. York.*